REMARKS

Reconsideration of the issues in the above referenced Office Action is respectfully solicited.

The objection to Claim 14 due to informalities has been considered. Claim 14 has been revised in order to overcome the objection. Further, Claims 1, 3 and 6-13 have been amended to address informalities therein, such as providing proper antecedent basis for various elements. Approval of the amended claims is respectfully requested.

The rejection of Claims 1-14 under 35 USC §103 as being unpatentable over U.S. Patent No. 5 319 671 to Hopf in view of the publication to Hopf (the Hopf publication) has been considered.

The Hopf patent and Hopf publication describe the same monitoring principle. The Hopf patent discloses a prewarning device for induction melting furnaces having an open circuit type arrangement. In the Hopf patent the electrical resistance of the ceramic furnace lining is detected between a first group of electrodes 12 with respect to a second group of electrodes 13 shown in Figure 3. Thus, the Hopf patent measures the resistance/capacitance between sections of the ceramic furnace lining 2 as set forth at column 4, lines 7-12. As shown in Figure 4, the electrodes are part of electrode networks 7, 8 each separately connected to an evaluation unit 16.

In operation, a small current passes between electrodes through the furnace lining 2. The resistance of the lining 2 between the electrode networks 7, 8 of the Hopf patent is dependent upon the temperature of the ceramic lining. Thus, the temperature of the lining is the detected value. The detected temperature-dependent resistance only functions with lining materials having the proper temperature characteristics. In practice, it is difficult to differentiate a high resistance value for a furnace lining from cable breakage or connection loss.

The system of the Hopf publication has a self-diagnosis function that provides a check every 15 minutes. Applicants' device, however, preferably continuously monitors the closed circuit.

The Office Action appears to rely on page 2, paragraph [0005] of Applicants' specification for the use of an ohmic resistor between a pair of electrodes. The Hopf publication and paragraph [0005], lines 4-9 and lines 12-14 of Applicants' specification disclose measuring an electrical resistance of a refractory material, such as a ceramic. Therefore, the Hopf publication and Hopf patent both are directed to measuring the resistance of a refractory material or ceramic, which is changed by temperature fluctuations, for the purpose of determining residual wall thickness to indicate localized wear of the furnace wall.

Applicants' invention provides an ohmic resistor R for the monitoring device, which is separate from a melting furnace wall. The monitoring device disclosed in the Hopf patent and publication does not have such a resistor, but rather only provides electrodes and a measuring device and relies on the furnace wall itself to determine a resistance.

Applicants' Claim 1 recites a monitoring device including "a closed circuit of several electrically conductive sections", "a first conductor section is series connected to an ohmic resistor R and a second conductor section" and that "the first conductor section is arranged directly adjacent, however, electrically isolatingly spaced from and with respect to the second conductor section".

This combination of features is not present in the applied prior art. The Hopf references, as discussed above, utilize the lining wall of the melting furnace as a resistance. The monitoring device of the Hopf references consists of the electrodes and the evaluation circuit. No ohmic resister is included, much less an ohmic resister located between first and second conductive sections (see Figure 4 of the Hopf patent).

The rejection appears to utilize the resistance of the lining for the monitoring device as a resistor to result in a closed circuit. The lining of the Hopf references is part of a furnace, rather than a monitoring device. Thus, Claim 1 distinguishes the Hopf references.

Applicants' Claim 6 further recites that the measuring/displaying device indicates "breakdown due to a conductor break". As best understood, the Hopf references provide a measurement of the temperature affected resistance of the lining wall. Such resistances tend to be very high and thus it is unlikely the Hopf references would detect a conductor break.

Applicants' Claim 11 recites that "the conductor sections are arranged on a surface of a refractory liner which faces away from the crucible filled with melt". In the Hopf references, the refractory liner or sections thereof act as the resistor. Thus, claiming a refractory liner in Applicants' Claim 11, which is separate from the resistor R, further distinguishes the Hopf references.

Added Claims 15-17, which depend from Claim 1, also distinguish the applied prior art. Claim 15 specifically recites "a refractory liner" and that "the ohmic resistor R has a resistance value that is clearly smaller than the resistance value of the refractory liner". This feature is disclosed in paragraph [0024] of Applicants' specification. As discussed above, the Hopf references do not have a resistor, much less a resistor with a smaller resistance value than the furnace lining.

Claim 16 recites that the "ohmic resistor R is not subjected to the furnace temperature". As discussed above, this differs from the temperature sensing Hopf references.

Applicants' Claim 17 recites that "the ohmic resistor ensures that the first and second conductor sections are otherwise electrically isolated from each other". Due to the presence of the ohmic resistor, current will not flow through

the furnace lining between the first and second conductor sections in Applicants' device.

For the above reasons, Claims 15-17 further distinguish the applied prior art.

Added Claims 18-20 are also allowable. Independent Claim 18 recites a monitoring device including "an ohmic resistor connecting the first conductor section and the second conductor section to form a closed series circuit, which ensures that the first and second adjacent conductor sections are electrically isolated from each other except for the current path of the ohmic resistor". The Hopf references provide a small current flow between the conductor sections through the ceramic lining. Thus there is no ohmic resistor providing a current path while the conductor sections are otherwise electrically isolated. Claim 19 is allowable for the reasons discussed above with respect to Claim 16.

Dependent Claim 20 recites that "the ohmic resistor has a resistance value that is clearly smaller than the resistance value of the refractory liner". The Hopf references rely on the refractory liner to act as the ohmic resistor. Therefore, Claim 20 clearly distinguishes the applied prior art.

For the above reasons, reconsideration and allowance of Claims 1-20 is respectfully requested.

Further and favorable reconsideration is respectfully solicited.

Respectfully submitted,

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